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To: Mr. R.A. Wright
Manager
Hydraulic Plant Equipment
Thermal and Hydraulic Generation Division

Attn: Mr. A. Dmochowski

WESTERN REGION MACHINE SHOP
PRELIMINARY SOILS INVESTIGATION

J.B. Enright

Results of the preliminary soils investigation along the Sir Adam Beck GS intake canal to select a site for the Western Region machine shop are summarized in this report. The surface stratum is a compact to dense silt fill overlying a series of compact to dense silt and clayey silt units. Below the silt and clayey silt units, a thin layer of very dense silt till covers the bedrock. A final site for the Western Region machine shop is recommended in a location of shallow bedrock which is overlain by soils competent to loadings of between 100 to 200 kPa. A more detailed investigation of the selected site is recommended.

INTRODUCTION

At the request of the Hydraulic Plant Equipment Department, a preliminary soils investigation was performed along the Sir Adam Beck GS intake canal. Data from this initial investigation was required to assist in selecting a site for the proposed Western Region Machine Shop building. As the building will incorporate a large area for working on runners weighing about 100 tons, heavy floor and column loads are anticipated. Surficial fill, possibly containing excavated rock, was suspected in some of the proposed building locations. Natural soil was anticipated to be compressible, medium strength clay and, therefore, subsurface conditions favourable for constructing deep foundations were sought. It is expected that a detailed investigation will be performed on the subsurface soils once a site has been selected. The results of this investigation are described below.

The soil investigation was carried out in two stages. The first stage consisted of advancing 19 borings numbered 1 to 19, to auger refusal on presumed bedrock contacts during the period of April 28 to May 6, 1986. The second stage of the investigation was carried out May 28, 1986 and consisted of establishing the depth to bedrock for 8 borings, numbered 20 to 27.

job	file	date	report no.
740643-192-575	843.	August 5, 1986	86-197-K

FIELD AND LABORATORY WORK

Engineering boreholes were performed using hollow stem and flight augers. A total of 28 boreholes were augered. Boreholes 1 to 19 provided samples which were used to construct a site profile and boreholes 20 to 27 were augered to refusal without sampling in order to provide more data on the bedrock location. The location of the boreholes are shown in Figures 1 to 3.

In boreholes 1 to 19, soil samples were taken at 5 foot intervals to refusal. In all boreholes, auger refusal is assumed to be bedrock, but it should be noted that bedrock was not "proven" by coring. Granular soils were generally sampled using the 51 mm OD split spoon sampler advanced by the Standard Penetration Test method. This test yields the "N" value for the soil being sampled. Cohesive soils were generally sampled by pushing a thin wall 51 mm OD Shelby tube sampler. The pocket penetrometer was used to obtain the field shear strength of cohesive, non-gravelly soils.

The laboratory testing included soil classification, moisture content, bulk density and shear strength. The results of the field and laboratory testing are shown on Figure 4 which is an interpretation of the stratigraphy constructed from the borehole samples which are summarized in Table I and Table II in the following section. Detailed results are shown on the individual borehole profiles (Figures 5 to 24).

SUBSOIL CONDITIONS

It may be seen from the interpreted subsoil stratigraphy (Figure 4) that the bedrock varies in depth from 1.5 m at borehole 15 to more than 20 m at borehole 1. The bedrock was covered in many locations by a 1.0 to 5.3 m thick layer of very dense reddish brown silty till. This till was covered by a succession of predominantly silty soils which vary from sandy silts with a trace of gravel just above the till changing to clayey silts closer to ground level. A layer of reddish brown silt, which may be fill, caps the sequence between boreholes 2 to 18 inclusive. This fill has a maximum thickness ranging from 1.5 to 3.0 m.

Table I outlines the results of the laboratory testing of soil samples between boreholes 1 to 14. The order in which the soils are outlined in the chart is the order in which they were encountered in drilling the borehole.

Table II summarizes the results of the laboratory testing of soil samples obtained from boreholes 15 to 19 inclusive. The order in which the soils are outlined in the chart is the order in which they were encountered in drilling the borehole.

In each of the boreholes numbered 1 to 19, the water level was obtained and recorded. A measureable water level was obtained in only three boreholes (BH 1, BH 3 and BH 8) that indicated the water table to be relatively close to the bedrock. However, since these water levels were

obtained before equilibrium was obtained they do not reflect the true water table. The remaining boreholes were either damp or dry.

Boreholes 4, 5 and 7 were observed to cave at depths of 4.80 m, 4.30 m, and 1.70 m respectively below the ground surface. All of the caving occurred in the fill material of reddish brown silt. The remaining boreholes were not observed to have any caving problems.

DISCUSSION

The depth to bedrock is shallower and more uniform between boreholes 15 to 28 than between boreholes 1 to 14. In addition, the overlying soil is more competent and consistent in the borehole 15 to 28 area. A final site for the Western Region Machine Shop in the area investigated by boreholes 15 to 28 is recommended because (a) the shallow bedrock will minimize the cost of heavily loaded foundations excavated to rock; (b) the surface soils are better suited to support heavy floor loads; (c) the area appears relatively free of wet or caving soils that may cause constructon difficulties.

On a preliminary basis, soils in the borehole 15 to 28 area should be capable of supporting spread footings loaded to between 100 and 200 KPa. Additional soil testing in this area is recommended to confirm soil bearing pressures, compressibility of soil beneath the floor slab and construction conditions once the final building location is selected.

CONCLUSIONS

The subsurface soil conditions have been documented and summarized in this report. The fill that was suspected prior to this field investigation was established to be present but was found to be free of any excavated rock. The variability of the soils encountered and the observed variation of the bedrock profile suggest that a more detailed investigation of the selected site will be required. This investigation should include coring to prove the bedrock location.

An area for locating the Western Region Machine Shop has been recommended. Foundation bearing pressures and floor slab design should be established by the detailed soil investigation.

Approved by:

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TABLE I

Soil Summary for Boreholes 1 to 14 Inclusive

SOIL	AVERAGE DENSITY (kg/cu.m)	AVERAGE WATER CONTENT (%)	AVERAGE SHEAR STRENGTH (kPa)
Silt, reddish brown, loose to compact, moist, with a trace of clay.	2065	20.6	43
Clayey silt, grey brown, compact, moist to dry, with a trace of clay and some dry silt seams near BH# 6	2056	23.7	143
Silt, reddish brown, dense, moist, trace of fine sand to coarse gravel, very stiff	2034	22.3	96
Clayey silt, grey brown, dense, moist, trace of fine sand and gravel, very stiff	2002	23.4	80
Silt till, very dense, brown to slightly reddish, moist, some fine to coarse sand and fine gravel	2393	9.3	109
Bedrock (assumed)			

TABLE II

Soil Summary for Boreholes 15 to 20 Inclusive

SOIL	AVERAGE DENSITY (kg/cu.m)	AVERAGE WATER CONTENT (%)	AVERAGE SHEAR STRENGTH (kPa)
Silt, reddish brown, with a little fine sand and a trace of clay, dense, moist	2080	17.6	120
Silt, grey brown, with a trace of clay and fine sand, very dense, moist	2052	20.4	154
Clayey silt, grey, with a trace fine sand, soft, moist	1956	24.2	70
Silt till, very dense, brown to slightly reddish, moist, some fine to coarse sand and fine gravel	2395	8.1	109
Bedrock (assumed)			

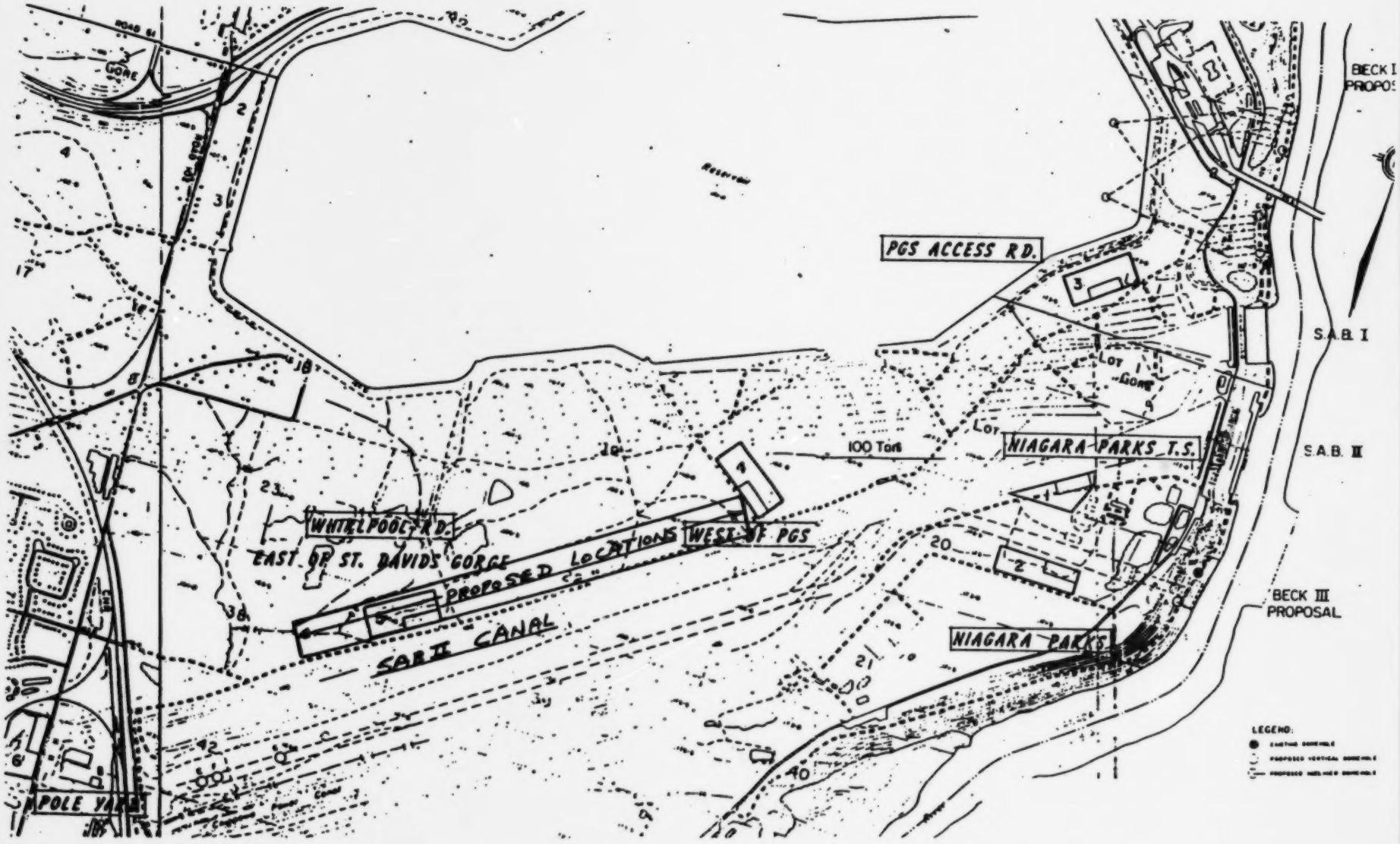

FIGURE 1

WESTERN REGION MACHINE SHOP PROPOSED
LOCATIONS ALONG SAB G.S. INTAKE CANAL

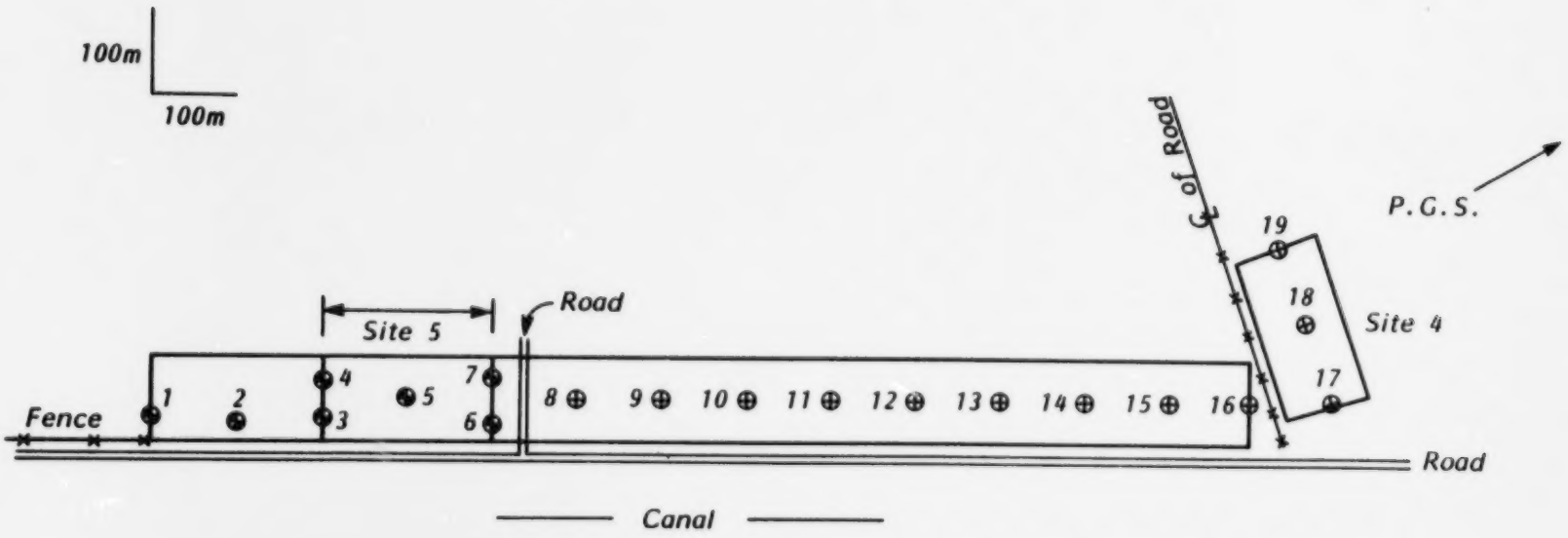

FIGURE 2

WESTERN REGION MACHINE SHOP
APPROXIMATE BOREHOLE LOCATIONS

171919 RC

Borehole No.	20	21	22	23	24	25	26	27	27A
Depth to Refusal (Ft.)	17.25	5.70	20.50	18.70	26.40	28.10	29.50	6.80	6.60
Depth to Refusal (M)	5.26	1.74	6.25	5.70	8.05	8.56	8.99	2.07	2.01

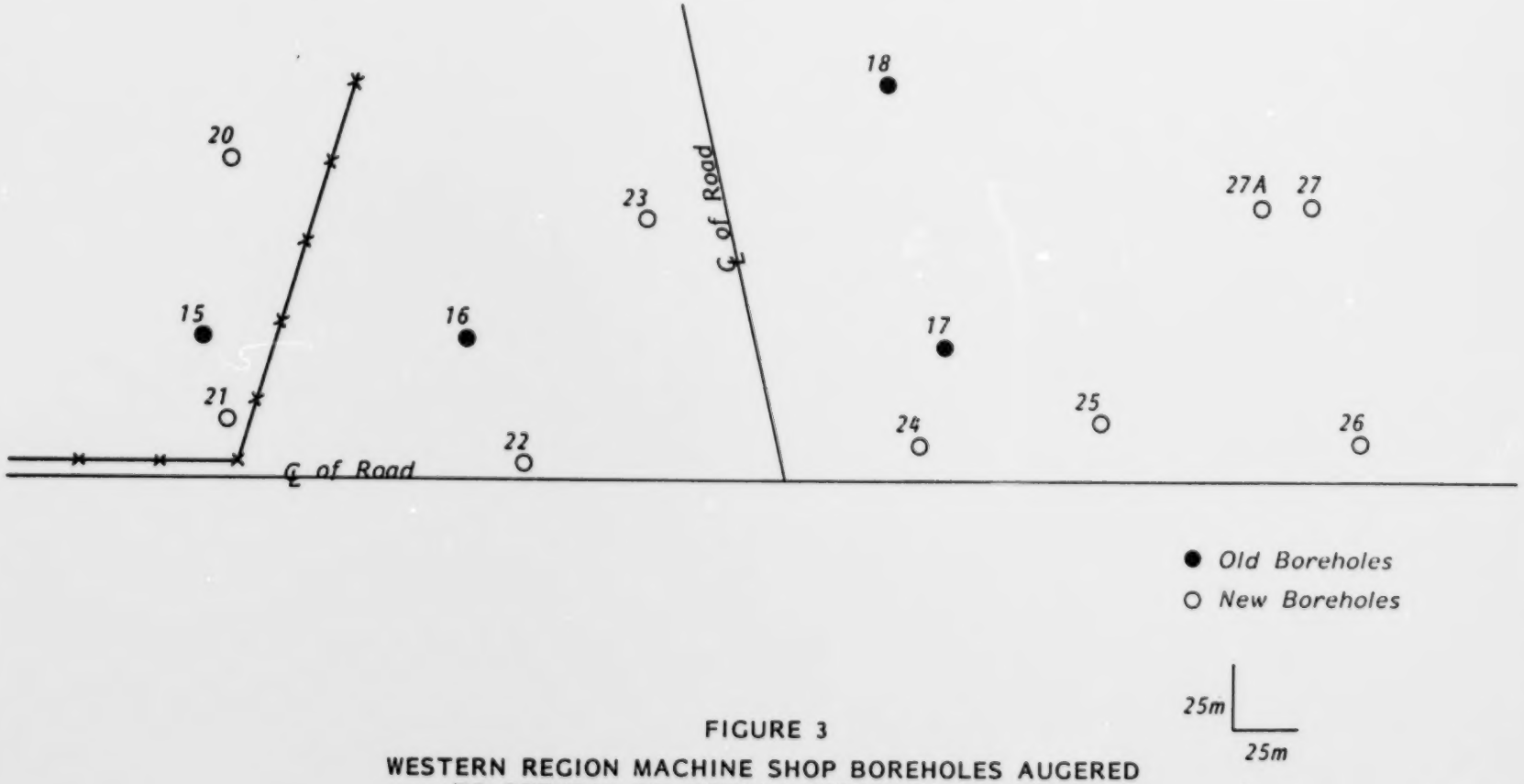

FIGURE 3

WESTERN REGION MACHINE SHOP BOREHOLES AUGERED TO REFUSAL TO OBTAIN BEDROCK LOCATION

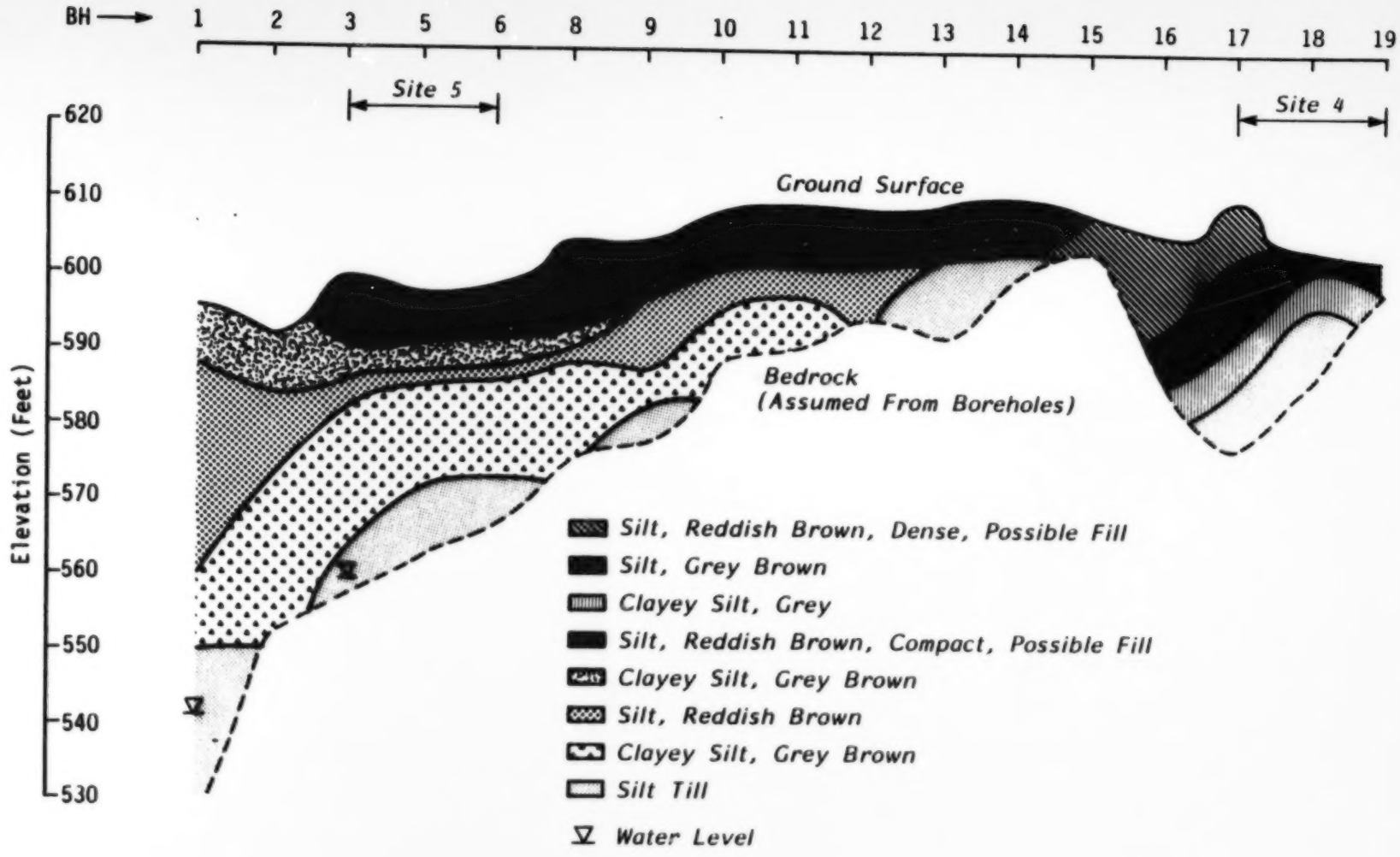

FIGURE 4

WESTERN REGION MACHINE SHOP INTERPRETED
BEDROCK PROFILE AND SUBSURFACE SOIL CONDITIONS

171921 R

PROJECT Western Region Machine Shop — HOLE TYPE Hollow Stem — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 6" — COMPILED A.A./J.B.

DIP — DRILLED May 5, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Clayey silt with a trace of fine sand, hard, brown, moist.											
2		1A		18								2072	20.5	u/c	215		
						2.52m											
3		2A		23		Silt with some clay and a trace of fine sand, compact, reddish brown, moist to wet.						2061	22.3	u/c	48		
4																	
5		3A		14									23.6				
6		4A		32									29.2				
7																	
						7.85m											
8						Clayey silt, firm, grey, damp to wet.												
9		5A		9									29.0				
10																	
						10.90m											
11						Silt with trace to little fine sand to coarse gravel, reddish brown, moist, compact.											
12		6B		Push									11.8				
13		7A		25									21.1				
						14.10m											
14						Till, very dense, brown to slightly reddish, moist, mostly silt with some fine to coarse sand and fine gravel.												
15		8A		133													
16												2372	9.4	u/c	404		
17					▽												
18																	
19		9A		82													
		10A		83		19.45m						2433	7.4	u/c	71		
													9.2				
20						End of Hole											

dwg no 20056 RD

GEOTECHNICAL DATA SHEET — hole no 1 — Fig 5 — sheet 1 of 1

PROJECT Western Region Machine Shop — HOLE TYPE Hollow Stem — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 6" — COMPILED A.A./J.B.

DIP — DRILLED May 6, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES / ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING W.R.	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1					Clayey silt, very stiff, grey brown, moist										
2	1A	☒	22		2.52m					2028	23.3	w/c	182		
3	2A	☒	38		Silt with a trace of clay, compact to dense, reddish brown, moist to wet						20.0				
4															
5	3A	☒	10		5.11m						25.2				
	4B	■	Push		Silt with a trace of fine sand, dense, moist yellowish brown					2057	19.2	w/c	57		
6	5A	☒	16		5.87m Silt with trace to little clay and trace of sand, compact, wet, brown.						28.9				
7															
8															
9	6A	⊠	16							2006	18.6				
10															
11															
12					12.01m Refusal										

GEOTECHNICAL DATA SHEET — hole no 2 — Fig 6 — sheet 1 of 1

dwg no 7550Z RD

PROJECT Western Region Machine Shop | HOLE TYPE Hollow Stem | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 6" | COMPILED A.A./J.B.

DIP | DRILLED April 29, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES / ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / RQD - %	(4) WATER LEVEL and CAVING W.R	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s WATER PRESS TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1					Silt, compact, moist, reddish brown with a trace of clay.										
2	1A	⊠	14		2.52m					2147	20.2				
3					Clayey silt, moist, grey compact										
3	2B	■	Push		4.12m					1981	25.4	w/c	71	PP	240 kPa
4					Clayey silt, dense, reddish brown moist.										
5	3B	■	Push		5.43m					2038	20.5	w/c	102		
6					Silty clay, very stiff, brown moist.										
6	4B	■	Push							1962	26.1	Q/u	227		
7															
8															
9															
9	5B	■	Push							1981	24.2	w/c	46		
10															
11					11.05m										
11					Till, compact, reddish brown grey, fine to coarse sandy silt with some fine to coarse grained sand and trace gravel.										
12	6A	⊠	33/6" Bouncing	▽							8.9				
13					12.62m End of Hole - Shale Bedrock										

dwg no 29958 RD

GEOTECHNICAL DATA SHEET | hole no 3 | Fig 7 | sheet 1 of 1

PROJECT Western Region Machine Shop | HOLE TYPE Hollow Stem | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 6" | COMPILED A.A./J.B.

DIP | DRILLED April 28, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Clayey silt, compact, brown, moist										
2		1A	☒	10							2042	23.1				
						2.52m										
3		2A	☒	15		Clayey silt, compact, greyish brown, moist.					2003	24.3				
4						4.04m										
5		3A	☒	30	C	Silt, dense, reddish brown, moist to wet, with a trace to little clay.						19.4				
6		4A	☒	20								26.2				
7						7.85m										
8						Silty clay, firm, greyish brown, wet.										
9		5A	☒	9		9.60m					1877	30.4				
10						End of Hole - Bedrock										

dwg no 200559 RD

GEOTECHNICAL DATA SHEET | hole no 4 | Fig 8 | sheet 1 of 1

PROJECT: Western Region Machine Shop — HOLE TYPE: Hollow Stem — OBSERVER: M.G.

LOCATION: See Figure 1 — HOLE SIZE: 6" — COMPILED: A.A./J.B.

DIP: — DRILLED: April 28, 1986 — CHECKED:

DATUM: PGS Top Desk — BEARING: — DRAWN: — APPROVED:

SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	WATER INF. (7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s WATER PRESS. TEST	FIELD TESTS (9) SPECIAL TESTS TYPE	RESULTS	LABORATORY TESTS: NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	RESULTS	(11) SPECIAL TESTS TYPE	RESULTS
1						Silt, loose, light brown, moist with a little clay.											
2		1A	⊠	9								2042	28.1				
						2.52m											
3						Clayey silt, comapct, brown, moist.											
		2A	⊠	21								2041	24.2	u/c	165		
4					-C-												
						Silt, compact, brown, wet.											
5		3A	⊠	22									22.8				
						5.57m											
6						Clayey silt, dense, greyish brown, moist, trace of fine gravel.											
		4A	⊠	30								2117	16.6				
7																	
						7.85m											
8						Till, comapct, reddish brown, moist, silt with some fine to coarse sand, a little fine gravel and trace of clay.												
9																	
		5B	■	Push								2331	11.6	Q/u	37		
						9.60m											
10						No Advancement-Possible Bedrock											

GEOTECHNICAL DATA SHEET — hole no 5 — Fig 9 — sheet 1 of 1

dwg no 200570 RD

86-197

PROJECT Western Region Machine Shop — HOLE TYPE Hollow Stem — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 6" — COMPILED A.A./J.B.

DIP — DRILLED April 29, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA						BORING LOG	WATER INF.	FIELD TESTS		LABORATORY TESTS					
SCALE-METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD-%	(4) WATER LEVEL and CAVING W.R.	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s; WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt, loose, reddish brown, moist, some fine clay and a trace of fine sand.										
2		1A		9		2.52m					2070	21.0				
3		2A		25		Clayey silt, compact, brown, some dry silt seams, dry and desicated.					2050	23.2	w/c	197		
4						4.04m										
5		3A		20		Silt, compact, reddish brown, wet, trace of clay.						24.0				
6		4A		16								23.7				
7						7.85m										
8						Till, dense, greyish brown, moist, silt with some fine to coarse sand, little fine gravel and trace of clay.										
9		5A		46		9.60m					2437	7.5	w/c	147		
10						End of Hole - Shale Bedrock										

GEOTECHNICAL DATA SHEET

hole no 6 — Fig 10

sheet 1 of 1

dwg no 20057 1 RD

PROJECT Western Region Machine Shop — HOLE TYPE Hollow Stem — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 6" — COMPILED A.A./J.B.

DIP — DRILLED April 28, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA						BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
		1A		3/6"		Silt, compact, reddish brown, moist, traces of clay, fine sand and organics.							16.1				
1						0.84m Silt, compact, brown, moist, traces of clay and fine sand.											
2		2A		23	C	2.51m						2029	18.3				
3		3A		8		Silt, loose, light brown, moist, trace of clay, trace of fine sand and gravel.						2162	19.2				
4						4.04m											
5		4A		8		Clayey silt, compact, reddish brown grey, traces of fine sand and gravel.						2069	26.8	w/c	50		
6						5.56m Till, compact, brown, moist, fine to coarse sandy silt with some fine to coarse gravel.											
		5A		29									9.2				
7						6.55m Bouncing - Possible Bedrock											

dwg no 200572 RD

GEOTECHNICAL DATA SHEET — hole no 7 — Fig 11 — sheet 1 of 1

86-197

PROJECT: Western Region Machine Shop | HOLE TYPE: Hollow Stem | OBSERVER: M.G.

LOCATION: See Figure 1 | HOLE SIZE: 6" | COMPILED: A.A./J.B.

DIP: | DRILLED: April 29, 1986 | CHECKED:

DATUM: PGS Top Desk | BEARING: | DRAWN: | APPROVED:

BORING DATA						BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE-METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / RQD-%	(4) WATER LEVEL and CAVING W.L.	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt, compact, brown, moist, trace of clay										
2		1A	⊠	14							2051	16.9				
3		2B	■	Push							2009	21.4	u/c	36	PP	99.84Pc
4						4.08m Silt, compact, greyish brown, moist, some clay and trace of organics.										
5		3A	⊠	10		5.03m					2150	19.0	u/c	85		
		4B	■	Push		Silt, compact, brown, moist, little clay.					1988	22.9	u/c	77	PP	81.6 kPa
6						5.80m Clayey silt, compact, light brown, moist.										
			⊠	11							1879	22	u/c	59		
7					▼											
8						8.54m End of Hole - Bedrock											

GEOTECHNICAL DATA SHEET | hole no 8 | Fig 12 | sheet 1 of 1

dwg no 200573 RD

PROJECT: Western Region Machine Shop | HOLE TYPE: Hollow Stem | OBSERVER: M.G.

LOCATION: See Figure 1 | HOLE SIZE: 6" | COMPILED: A.A./J.B.

DIP: | DRILLED: April 30, 1986 | CHECKED:

DATUM: PGS Top Desk | BEARING: | DRAWN: | APPROVED:

BORING DATA						BORING LOG		WATER INF.	FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt, compact, reddish brown, moist, with a little clay and a trace of sand and fine gravel.											
2		1B		Push								2068	18.7	w/c	35	PP	73.6 kPa
						2.75m											
3		2B		Push		Silt, compact, reddish brown, moist, with a little to some clay and a trace of fine sand and gravel. P.P. V. Stiff.						1968	23.5	Q/u	73	PP	146.4kPa
4																	
5		3B		Push								2048	22.2	w/c	70		
						5.64m											
6		4A		38		Silt, dense, reddish brown, moist, with a little fine sand and gravel.						2354	9.4				
						7.09m											
7						Sandy silt, fine to coarse with some fine gravel, compact, brown, moist to wet											
8		5A		14		8.26m							11.2				
						End of Hole - Bedrock											
9																	

GEOTECHNICAL DATA SHEET

hole no 9 | Fig 13

sheet 1 of 1

dwg no 200578 RD

PROJECT Western Region Machine Shop | HOLE TYPE Hollow Stem | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 6" | COMPILED A.A./J.B.

DIP | DRILLED April 30, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE-METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD-%	(4) WATER LEVEL and CAVING W.R	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Reddish brown silt with little to some clay, compact, moist to wet.										
2		1A	⊠	10							2120	20.3	u/c	51		
	2.52m															
3						Reddish brown silt with traces of clay and fine sand, compact, moist to wet.										
		2A	⊠	12							1994	22.3				
4	4.04m															
						Silt with some clay, very stiff, brown, moist.										
5		3B	■	Push							1987	24.7	u/c	107		
6	6.07m															
						End of Hole - Bedrock										
7																

GEOTECHNICAL DATA SHEET

hole no 10 | Fig 14

sheet 1 of 1

dpa no 200575 RD

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED April 30, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE-METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD-%	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Clayey silt with little fine sand and fine gravel changing to clayey silt with some organics, stiff, grey brown, moist.											
2				Push		2.59m						2040	21.1	Q/u	42		
3				Push		Silt with trace to little clay, dense, reddish brown, moist.						2034	21.6	c/u	164	PP	172.8 kPa
4						3.96m											
5				Push		Clayey silt with some fine sand and fine gravel, very stiff, grey to reddish brown, moist.						1971	27.1	u/c	113	PP	172.8 kPa
6						5.73m End of Hole - Bedrock											

dwg no 200576 RD

GEOTECHNICAL DATA SHEET

hole no 11 | Fig 15

sheet 1 of 1

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED April 30, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE-METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / RQD-%	(4) WATER LEVEL and CAVING / W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt with some sand and fine gravel & little clay, compact, brown, moist.											
2		1A	⊠	10								2019	24.5	w/c	37		
	2.52m					Silt with a little clay and a little sand, very dense, reddish brown, moist.											
3		2A	⊠	59								2092	19.4				
4	4.42m					No advance - Possible boulder or bedrock											
5																	

GEOTECHNICAL DATA SHEET

hole no 12 | Fig 16

sheet 1 of 1

dwg no 208577 RD

PROJECT Western Region Machine Shop — HOLE TYPE Flight Auger — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 4" — COMPILED A.A./J.B.

DIP — DRILLED May 1, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA						BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION / (6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt with little clay and some fine sand, dense, moist, reddish brown.										
2		1B	■	Push		2.52m					1947	25.0	u/c	47		
3		2A	⊠	34		Silt till with some clay & little fine sand to fine gravel, dense to V. dense, reddish brown, moist					2309	12.8	u/c	151		
4																
5		3A	⊠	64		5.34m					2280	10.7				
6						Bedrock - End of Hole										

GEOTECHNICAL DATA SHEET — hole no 13 — Fig 17 — sheet 1 of 1

dwg no 200578 RD

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED May 1, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS				
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / RQD - %	(4) WATER LEVEL and CAVING / W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt with some clay and a trace of sand, stiff, brown, moist.											
2		18		Push		2.52m						1970	25.6	u/c	46		
3				6/3" Bouncing		Silt with some coarse, and fine sand and a little gravel, very dense, moist, brown 3.20m W.R. Till like.							10.9				
4						Refusal - Bedrock											

GEOTECHNICAL DATA SHEET | hole no 14 | Fig 18 | sheet 1 of 1

dwg no 200579 RD

PROJECT Western Region Machine Shop — HOLE TYPE Flight Auger — OBSERVER M.G.

LOCATION See Figure 1 — HOLE SIZE 4" — COMPILED A.A./J.B.

DIP — DRILLED May 14, 1986 — CHECKED

DATUM PGS Top Desk — BEARING — DRAWN — APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						*Silt with a little clay and some coarse and fine sand, brown, moist, very dense.											
2																	
	3.05m																
3	3.28m	1A	⊠	12/3" Bouncing		See above for description*							8.7				
4						End of Hole											

GEOTECHNICAL DATA SHEET

hole no 14A — Fig 19

sheet 1 of 1

dwg no 200580 RD

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED May 1, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING W R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
		18		Push		Silt with a little fine sand and a trace of clay, very dense, reddish brown moist.						2075	17.8	u/c	109		
1						1.33m Bedrock											
2																	

GEOTECHNICAL DATA SHEET

hole no 15 | Fig 20

sheet 1 of 1

dwg no 200581 RD

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 9" | COMPILED A.A./J.B.

DIP | DRILLED May 2, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING W.R	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER P. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt with a trace of fine sand to coarse gravel, and a trace of clay, dense, moist, reddish brown.											
2		1A		57								2076	19.0	w/c	116		
3		2A		50								2080	18.6	w/c	136		
4						4.04m Grey clay silt with a trace of fine sand, soft, moist.											
5		3A		15								1969	27.5	w/c	55		
		4B		Push								1964	24.0	w/c	97		
6						5.91m No Advancement - Bedrock											

GEOTECHNICAL DATA SHEET

hole no 16 | Fig 21

sheet 1 of 1

dwg no 20582 RD

PROJECT: Western Region Machine Shop | HOLE TYPE: Flight Auger | OBSERVER: M.G.

LOCATION: See Figure 1 | HOLE SIZE: 9" | COMPILED: A.A/J.B.

DIP: | DRILLED: May 2, 1986 | CHECKED:

DATUM: PGS Top Desk | BEARING: | DRAWN: | APPROVED:

BORING DATA						BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1						Silt with traces of clay and fine sand, dense, moist, brown.											
2		1A	⊠	39		2.52m						2087	14.9				
3		2A	⊠	16		Gray silt with some clay and a trace of fine sand, soft moist. 3.59m						1968	22.7				
4		3B	■	Push		Gray silt with little clay and fine sand, dry and dessicated, soft. 4.35m						1988	19.8	w/c	57		
5		4B	■	Push		Gray clayey silt with a little fine sand, soft, moist. 5.57m						2019	22.2	w/c	117		
6		5B	■	Push		Brown silt with a trace of clay and fine sand, very dense, moist.						2029	20.7	w/c	82		
7		6A	⊠	68		7.93m						2074	18.8				
8						Brown silt with some fine to coarse sand and fine gravel, very dense, moist, "Till Like".											
9		7A	⊠	95		9.60m						2395	8.1				
10						End of Borehole - Bedrock											

dwg no 200583 RD

GEOTECHNICAL DATA SHEET | hole no 17 | Fig 22 | sheet 1 of 1

86-197

PROJECT Western Region Machine Shope | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED May 2, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA						BORING LOG		WATER INF.		FIELD TESTS		LABORATORY TESTS					
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / ROD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' soil/rock cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1		1B	■	Push		Grey, brown silt with little clay and traces of fine sand to fine gravel, soft.						1893	26/9	q/c	32		
						0.99m											
2		2A	⊠	33		Brown clayey silt with traces of fine sand and gravel, dense, damp to dry and desicated.						2054	21.7	w/c	213		
						2.52											
3		3A	⊠	79		Reddish brown silt with a little clay and a trace of fine sand, compace, moist.						2142	18.3	w/c	148		
4																	
5		4A	⊠	29								2306	11.7	w/c	153		
						5.61m											
6						Refusal - Bedrock											

dwg no 20558 RD

GEOTECHNICAL DATA SHEET | hole no 18 | Fig 23 | sheet 1 of 1

PROJECT Western Region Machine Shop | HOLE TYPE Flight Auger | OBSERVER M.G.

LOCATION See Figure 1 | HOLE SIZE 4" | COMPILED A.A./J.B.

DIP | DRILLED May 2, 1986 | CHECKED

DATUM PGS Top Desk | BEARING | DRAWN | APPROVED

BORING DATA					BORING LOG	WATER INF.		FIELD TESTS		LABORATORY TESTS				
SCALE - METRES	ELEV / DEPTH	(1) SAMPLE NO	(2) SAMPLE TYPE	(3) 'N' VALUE per 0.3m / RQD - %	(4) WATER LEVEL and CAVING / W.R.	(5) DESCRIPTION	(6) REMARKS	(7) OBSERVATION WELL DATA	(8) 'k' cm/s / WATER PRESS. TEST	(9) SPECIAL TESTS TYPE	(9) SPECIAL TESTS RESULTS	NATURAL DENSITY kg/m³	MOISTURE CONTENT - %	(10) SHEAR STRENGTH kPa TYPE	(10) SHEAR STRENGTH kPa RESULTS	(11) SPECIAL TESTS TYPE	(11) SPECIAL TESTS RESULTS
1				Push		Grey silt with some clay and fine to coarse sand to fine gravel, very stiff dessicated, dry.						2168	14.8	w/c	52		
						1.34m End of Hole - Bedrock											
2																	

GEOTECHNICAL DATA SHEET

hole no 19 | Fig 24

sheet 1 of 1

dwg no 20058S RD